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Scattered data interpolation and approximation using bivariate C^1 piecewise cubic polynomials. (English) [Zbl 0873.65011](#)

Comput. Aided Geom. Des. 13, No. 1, 81-88 (1996).

Summary: We show that if the scattered data over a polygonal domain can be quadrangulated, then the space of bivariate C^1 piecewise cubic polynomial functions on a triangulation obtained from the quadrangulation has the full approximation order. We point out that our method is more efficient than the Clough-Tocher scheme.

MSC:

[65D17](#) Computer-aided design (modeling of curves and surfaces)

[68U07](#) Computer science aspects of computer-aided design

[65D07](#) Numerical computation using splines

Cited in **15** Documents

Keywords:

bivariate splines; B-net; full approximation order; quadrangulation; scattered data interpolation

Full Text: [DOI](#)

References:

- [1] Alfeld, P., A bivariate C^2 clough-tocher scheme, Computer aided geometric design, 1, 257-267, (1984) · [Zbl 0597.65005](#)
- [2] Alfeld, P.; Piper, B.; Schumaker, L.L., An explicit basis for C^1 quartic bivariate splines, SIAM J. numer. anal., 24, 891-911, (1987) · [Zbl 0658.65008](#)
- [3] Bramble, J.H.; Hilbert, S.R., Bounds for a class of linear functionals with applications to Hermite interpolation, Numer. math., 16, 362-369, (1971) · [Zbl 0214.41405](#)
- [4] Chui, C.K.; Lai, M.-J., On bivariate super vertex splines, Constr. approx., 6, 399-419, (1990) · [Zbl 0726.41012](#)
- [5] Ciarlet, P.G., Sur l'element de clough et tocher, RAIRO anal. numér., R2, 19-27, (1974) · [Zbl 0306.65070](#)
- [6] de Boor, C., B-form basics, (), 131-148
- [7] de Boor, C.; Höllig, K., Approximation order from bivariate C^1 -cubics: a counterexample, (), 649-655 · [Zbl 0545.41017](#)
- [8] de Boor, C.; Höllig, K., Approximation power of smooth bivariate pp functions, Math. Z., 197, 343-363, (1988) · [Zbl 0616.41010](#)
- [9] Farin, G., Triangular Bernstein-Bézier patches, Computer aided geometric design, 3, 83-127, (1986)
- [10] Gao, J., A scheme of C^2 interpolation over triangulations, (1993), manuscript
- [11] Gmelig Meyling, R.H.J., Approximation by cubic C^1 -splines on arbitrary triangulation, Numer. math., 51, 65-85, (1987) · [Zbl 0595.41010](#)
- [12] Gmelig Meyling, R.H.J.; Pfluger, P.R., Smooth interpolation to scattered data by bivariate piecewise polynomials of odd degree, Computer aided geometric design, 7, 439-458, (1990) · [Zbl 0708.65012](#)
- [13] Grandine, T.A., An iterative method for computing multivariate C^1 piecewise polynomial interpolants, Computer aided geometric design, 4, 307-320, (1987) · [Zbl 0637.65008](#)
- [14] Lai, M.J., Approximation order from bivariate C^1 -cubics on a four-directional mesh is full, Computer aided geometric design, 11, 215-223, (1994) · [Zbl 0792.41023](#)
- [15] Lai, M.J.; Schumaker, L.L., Scattered data interpolation using C^2 supersplines of degree six, SIAM numer. anal., (1995), to appear
- [16] Schumaker, L.L., Bounds on the dimension of spaces of multivariate piecewise polynomials, Rocky mountain J. math., 14, 251-264, (1984) · [Zbl 0601.41034](#)

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